# DIETARY NITRATE SUPPLEMENTATION INCREASES FRACTIONAL EXHALED NITRIC OXIDE: IMPLICATIONS FOR THE ASSESSMENT OF AIRWAY HEALTH IN ATHLETES

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**Background:** Fractional exhaled nitric oxide (FeNO) is a simple tool that has an established role in the assessment of airway inflammation in athletes. Specifically, FeNO provides information concerning asthma phenotypes, aetiology of respiratory symptoms, response to anti-inflammatory agents, course of disease and adherence to medication. It is recognised that FeNO can be influenced by a variety of external factors (e.g. atopic status, exercise, respiratory tract infection), however, there remains limited research concerning the impact of dietary nitrate ingestion. The primary aim of this study was therefore to evaluate the effect of acute dietary nitrate supplementation on FeNO and resting pulmonary function parameters.

**Method:** The study was conducted as a randomised double-blind placebo-controlled trial. Thirty male endurance trained athletes (age: 28 ± 6 yrs; BMI: 23 ± 2 $kg.m^{-2}$) free from cardio-respiratory and metabolic disease, and stable at time of study entry (i.e. entirely asymptomatic without recent respiratory tract infection) attended the laboratory on two separate occasions. On arrival to the laboratory, athletes consumed either 140ml nitrate-rich beetroot juice (15.2 mmol nitrate) (NIT) or nitrate-depleted beetroot juice (0 mmol nitrate) (PLA). In accordance with international guidelines all athletes performed resting FeNO and forced spirometry (2.5hrs post ingestion). Airway inflammation was evaluated using established FeNO thresholds: (intermediate [≥25ppb] and high [>50ppb]).

**Results:** All athletes demonstrated normal baseline lung function ($FEV_1$ % predicted >80%). A three-fold rise in resting FeNO was observed following NIT (median [IQR]): 32ppb [37] in comparison to PLA: 10ppb [12] ($P<0.001$). Twenty-two athletes (73%) presented with raised FeNO following NIT (intermediate: n = 13; high: n = 9) in comparison to four athletes (13%) following PLA (intermediate: n = 2; high: n = 2). Despite this, no difference was observed in any pulmonary function parameters between visits ($P>0.05$).

**Conclusion:** Dietary nitrate ingestion should be considered when employing FeNO for the assessment of airway health in athletes. Our findings have implications concerning the decision to initiate or modify inhaler therapy. Further research is therefore required to determine the impact of chronic dietary nitrate ingestion

on pulmonary function and bronchoprovocation testing in athletes with pre-existing asthma and/or exercise-induced bronchoconstriction.